SJDI

LOCAL STANDARD ITEM

FY-2005

ITEM NO: 099-04JI

DATE: 18 NOV 2002

CATEGORY: I

1. SCOPE:

1.1 Title: MCM Class Ship Glass Reinforced Plastic (GRP) Repair and Fabrication Procedures; accomplish

1.2 Location of Work:

1.2.1 Throughout Ship

1.3 Identification:

1.3.1 Not Applicable

2. REFERENCES:

2.1 Standard Items

2.2 S9100-AD-MMA-010/MCM-1 Class, Manual For Structural Repair of MCM-1 Class Ships

2.3 Main Hull Fiberglass Drawing (See 4.1)

2.4 S9086-VG-STM-010, Chapter 634, Deck Coverings

2.5 Diesel Oil Storage Tank Drawing (See 4.2)

2.6 Fresh Water Storage Tank Drawing (See 4.3)

2.7 Miscellaneous Tanks - Fiberglass Drawing (See 4.4)

3. REQUIREMENTS:

3.1 Accomplish the requirements of 009-09 of 2.1 for the following GRP related work required by this specification package using 2.2 through 2.7 for guidance.

3.1.1 Repairs to existing GRP hull/deck sheathing.

3.1.2 Removal of existing and installation of new GRP hull/deck sheathing.

3.1.3 Repairs to existing GRP tank structures/members.

3.1.4 Build-ups/laminations of existing GRP structures/members.

3.1.5 Fabrication/lamination of new GRP structures/members.

3.2 The procedure required by 3.1 shall:

3.2.1 Include materials required by drawings referenced in work specifications.

3.2.2 Include safety precautions for working with GRP materials.

3.2.3 Include clean-up and environmental concerns.

3.2.4 Include techniques/step-by-step procedures/shop practices to accomplish work listed in 3.1.1 through 3.1.5.

3.2.5 Require the use of grinders/sanders which utilize vacuum hose dust collection to accomplish requirements of 3.1.1 through 3.1.5.

3.2.6 Incorporate the requirements of 2.2 through 2.7, work specifications, and the resin/hardener manufacturer's instructions for accomplishing GRP inspections and repairs. Inspection methods may include visual, probe, and hammer sounding methods, moisture meter inspections, and Barcol hardness readings. See 4.6 through 4.8.

3.2.6.1 Include requirements for containments and dehumidification units for accomplishing repairs of existing and installation of new GRP hull/deck sheathing. See Attachment "A".

4. NOTES:

4.1 Select the pertinent Main Hull Fiberglass Drawing for 2.3 from the following list:

100-5843573 Rev F - (MCM 1)
111-5976356 Rev C - (MCM's 2, 4 and 7)
100-6134052 Rev D - (MCM's 3, 5, 6 and 8)
100-6644606 Rev B - (MCM's 9 through 14)

4.2 Select the pertinent Diesel Oil Storage Tank Drawing for 2.5 from the following list:

541-5844081 Rev G - (MCM 1)
540-5976852 Rev H - (MCM 2)
541-6134555 Rev D - (MCM's 3, 5, 6 and 8)
540-6135350 Rev C - (MCM's 4 and 7)
541-6645112 Rev C - (MCM's 9 through 14)

4.3 Select the pertinent Fresh Water Storage Tank Drawing for 2.6 from the following list:

530-5844052 Rev E - (MCM 1)
533-5976843 Rev F - (MCM 2)
530-6134520 Rev C - (MCM's 3, 5, 6 and 8)
533-6135341 Rev A - (MCM's 4 and 7)
530-6645075 Rev C - (MCM's 9 through 14)

4.4 Select the pertinent Miscellaneous Tanks - Fiberglass Drawing for 2.7 from the following list:

200-5843653 Rev D - (MCM 1)
120-5976366 Rev E - (MCM 2)
200-6134139 Rev E - (MCM's 3, 5, 6 and 8)
120-6134867 Rev C - (MCM's 4 and 7)
200-6644685 Rev C - (MCM's 9 through 14)

4.5 Work in this item interfaces with Work Item(s):

Any Work Item accomplished during the ship's availability which requires GRP repairs and/or fabrication.

4.6 When accomplishing moisture meter inspections of GRP sheathed hulls (including hulls coated with anti-fouling paint), it is important to realize that absolute moisture content cannot be read from the meter due to the diversity of materials used in construction. The first step therefore is to establish a datum reading on an area of the ship's GRP sheathed hull which would reasonably be expected to be "dry". Having established this datum basis, further readings can be compared with datum to identify areas of moisture ingress. As an example let us say you are receiving rather uniform readings of near 20 on the "A" scale and suddenly the meter jumps to a reading of 23, this would be a suspect area for osmosis caused moisture degradation.

4.7 Possible source for Moisture Meter is:

J. R. Overseas Company, P.O. Box 370, Kent, Ct., 06757, Phone Number: (860) 927-3808, Fax Number:(860) 927-3719 Attn: John Raabe II, Marine Moisture Meter, Model GRP 33.

4.8 Possible source for Barcol Impressor is:

Instrument Laboratory, 2508 West Woodland Dr., Anaheim, Ca., 92801, Phone Number: (714) 236-7900, Fax Number: (714) 220-0700, Hand-Held Portable Hardness Tester, Model Number GYZJ 936-1.

ATTACHMENT "A"

GENERAL GRP LAMINATING GUIDANCE

ENVIRONMENT

GRP repair and alteration work shall be accomplished in an area that is clean and dry having an ambient temperature between 60 degrees Fahrenheit and 90 degrees Fahrenheit. Good ventilation should also be provided, particularly since the repair and alteration work will be accomplished "in-situ".

If the required environmental conditions cannot be met under ambient conditions or with heat lamps, a temporary enclosure should be erected to control the GRP work environment. A waterproof tent can be erected protecting the area from the elements, provided the following requirements are met:

- The temperature and humidity inside the enclosure is within the required range for at least two hours prior to start of lamination.

- The temperature and humidity is within the required range during lamination and for a 24 hour period after completion of lamination.

- An air lock is provided to prevent humidity and environmental fluctuations during personnel egress and ingress during the repair activity.

- The enclosure is large enough for storage of the repair or alteration material.

- Adequate ventilation is maintained during the laminating and curing process.

A framework constructed of wood 2 x 4s, covered by plastic sheets, can be used to create a temporary shelter for performing GRP lamination. Dehumidifiers and space heaters or infra-red heat lamps may be used within this area to create the proper GRP work environment.

TEMPERATURE/HUMIDITY EFFECTS

The temperature and humidity range for performing repair and alteration lamination shall be between 60 degrees Fahrenheit and 90 degrees Fahrenheit and less than 80 percent relative humidity, respectively. Alternatively, for the humidity requirement, the ambient temperature of the GRP work site should be at least 5 degrees Fahrenheit above the dew point to prevent a "condensing atmosphere". GRP work performed with temperatures less than 60 degrees Fahrenheit and relative humidity higher than 80 percent will result in longer curing times, and may result in an undercured laminate. Infra-red heat lamps may be employed to speed curing time. The performing activity should refer to the resin manufacturer's instructions to determine if any modifications to the resin chemistry are required and for recommendations on the amounts of promoter and catalyst to be used based on the work site conditions.

NOTE: The guidance provided in ATTACHMENT "A" has been excerpted from the MHC 51 Class GUIDANCE FOR GRP REPAIRS AND ALTERATIONS and is provided for guidance only.